METHOD FOR WEATHERPROOFING SUBSTRATES

This is a continuation, of the application Ser. No. 279,062 filed June 30, 1981 which was a division of application Ser. No. 129,249 filed Mar. 11, 1980 which was a continuation-in-part of application Ser. No. 103,438 filed Dec. 14, 1979 which was a continuation-in-part of application Ser. No. 041,592 filed May 23, 1979, all now abandoned.

BACKGROUND OF THE INVENTION

This invention relates to compositions for coating surfaces such as roofs and the like.

The most widely used roof coating compositions are based on asphalt. While these materials are useful, they have several disadvantages. For example, the material tends to dry out and crack and requires a good deal of maintenance. In addition, asphalt materials are poor heat insulators and do not reflect heat. It has been proposed in the past to provide various other materials as substitutes for asphalt. These proposed substitutes, however, have not been adopted because of disadvantages which outweigh the disadvantages of conventional asphalt materials. Among the main disadvantages of the proposed substitute materials are increased cost of materials and/or application, lack of durability, dangerous chemcials, hazardous application methods, and the like.

It is an object of the present invention to provide an improved coating composition. It is a further object of the present invention to provide a new coating composition which is a feasible substitute for asphalt compositions conventionally applied as a roof coating composition and to provide a method of coating roofs therewith. It is a further object to provide such coating compositions which are inexpensive, easily applied, and which to not involve the use of hazardous chemicals. It is yet a further object of the invention to provide such coating compositions which provide other advantages over asphalt coating compositions such as improved heat insulation properties and improved heat reflective properties.

The foregoing and other objects which will be apparent to those of ordinary skill in the art are achieved in accordance with the present invention by providing a coating composition comprising about 40 to 80 percent by volume of particles of polystyrene foam plastic particles, in admixture with about, correspondingly, 60 to 20 percent by volume of an aqueous synthetic resin latex (the percentages being based on the total amount of polystyrene and aqueous latex). The aqueous synthetic resin latex emulsion can be any such resin latex capable of forming a film. Suitable latices include those used in latex paints and these are preferred because of their ready availability. Common latices of this type contain acrylic resins, polyvinyl acetate resins, and butadiene-styrene resins. The solids content of the resin latex can vary considerably and is generally about 25–27 percent by weight and typically about 35 percent by weight. The balance of the resin latex is made up of water and conventional addenda such as stabilizers and the like.

Suitable aqueous synthetic resin latices are those made by emulsion polymerization and commonly used in paints, particularly exterior paints. As disclosed in U.S. Pat. No. 3,356,627, important polymers include polymers and copolymers of: (1) vinyl esters of an aliphatic acid having 1 to 18 carbon atoms, especially vinyl acetate; (2) acrylic acid esters and methacrylic acid esters of an alcohol having 1 to 18 carbon atoms, especially methyl acrylate, ethyl acrylate, butyl acrylate, 2-ethylhexyl acrylate, methyl methacrylate, ethyl methacrylate and butyl methacrylate; and (3) mono- and di-ethylenically unsaturated hydrocarbons, such as ethylene, isobutylene, styrene, and aliphatic dienes, such as butadiene, isoprene, and chloroprene.

Poly(vinyl acetate) and copolymers of vinyl acetate with one or more of the following monomers: vinyl chloride, vinylidene chloride, styrene, vinyltoluene, acrylonitrile, methacrylonitrile, one or two of the acrylic and methacrylic acid esters mentioned above are well-known as the film-forming component of aqueous base paints. Similarly copolymers of one or more of the acrylic or methacrylic acid esters mentioned above with one or more of the following monomers: vinyl acetate, vinyl chloride, vinylidene chloride, styrene, vinyltoluene, acrylonitrile, and methacrylonitrile are also more or less conventionally employed in aqueous base paints. Homopolymers of ethylene, isobutylene, and styrene, and copolymers of one or more of these hydrocarbons with one or more esters, nitriles or amides of acrylic acid or of methacrylic acid or with vinylidene chloride are also used. The diene polymers are generally used in aqueous base paints in the form of copolymers with one or more monomers following: styrene, vinyltoluene, acrylonitrile, methacrylonitrile, and the abovementioned esters of acrylic acid or methacrylic acid. It is also quite common to include a small amount, such as ½ to 2.5% or more, of an acid monomer in the monomer mixture used for making the copolymers of all three general types mentioned above by emulsion polymerization. Acids used include acrylic, methacrylic, itaconic, aconitic, citraconic, crotonic, maleic, fumaric, the dimer of methacrylic acid, and so on. Additional suitable latices are disclosed in the following U.S. Pat. Nos. 3,356,627; 3,320,198; 2,965,590; 2,904,523; 2,888,422; 3,008,847; 3,104,234; 3,037,881 the disclosures of which are herein incorporated by reference. Suitable commercially available acrylic resins include those denoted as Rhoplex (e.g. AC33, LC67, AC636, AC64, LC45, and AC634).

In accordance with the invention, polystyrene foam beads are blended with the latex emulsion and the admixture is coated onto a roof or other surface in a desirable thickness. The water present in the emulsion, as well as any added water, fibres by evaporation leaving a tenacious, lightweight, water proof and heat insulating coating made up of the foam polystyrene particles bound together by the synthetic resin. Generally, the amount of latex resin solids in the coating composition and in the final coating is about 2 to 60 parts by volume per 100 parts by volume of foam polystyrene particles. Where cost is a major factor, the amount of resin solids is preferably as low as possible and preferably in the range of 2 to 20 parts, same basis. For some applications, a high resin solids content of over 20 parts, up to as much as about 60 parts (same basis) is desirable. In these instances, and in others in which cost is not of major importance, the amount of resin solids can be in the range of from over 20 up to 60 parts by volume per 100 parts by volume of foam polystyrene particles.

The polystyrene foam particles preferably have a particle size of about 0.03 to 0.3 inches. The particles are made of conventional polystyrene foam such as expanded polystyrene resin having a specific gravity of about 0.02 to 0.1 and a molecular weight of about